

-7-

REMARKS

The remainder of this reply is set forth under appropriate subheadings for the convenience of the Examiner.

Elections/Restrictions

Applicants affirm election of Group I, Claims 1-32 and 47, drawn to a saturable absorber Q-switch and a laser system. Applicants acknowledge that Claims 33-46 are withdrawn from further consideration. Applicants have canceled Claims 33-46.

Interviews with Examiners Pi and Vy

Applicants and Applicants' Attorney would like to thank Examiners Ip and Vy for granting a telephone interview that was conducted on Thursday, September 11, 2003. The Examiners' suggestions have been incorporated into the claims.

Claim Amendments

Independent Claims 1, 16 and 47 are amended to make more clear that the monocrystalline lattice is a spinel crystal structure and chemical composition, and to include the statement that the composition includes a molar ratio of magnesium:cobalt:aluminum of $(1-x):x:y$, where x is greater than 0 and less than about 1, and y is greater than 2 and less than 8. Support for these amendments can be found throughout the specification, including, for example, page 3, lines 22-25 and page 5, line 28 through page 6, line 10. No new matter has been added.

Rejection of Claims 1-32 and 47 Under 35 U.S.C. § 112, First Paragraph

Claims 1-32 and 47 are rejected under 35 U.S.C. § 112, first paragraph. In particular, the Examiner stated that the formula $Mg_{1-x}Co_xAl_yO_2$ renders the claim indefinite because the claims recite only a formula which, according to the Examiner, is a mathematical algorithm, and that the claims failed to define chemical limitations. Further, the Examiner stated that it is not clear how the formula of a silver halide color active material is being used for a saturable absorber Q-

-8-

switch, and that the claims fail to recite structural limitations in order to form a saturable absorber Q-switch.

35 U.S.C. § 112, first paragraph, states the following:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The requirement that claims particularly point out and distinctly claim subject matter which the Applicant regards as his invention is set forth in the second paragraph of 35 U.S.C. § 112, which states:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Further, and specifically with respect to chemical formulas, the Manual of Patent Examining Procedure (MPEP) states that claims to chemical compounds employing formulas should not be considered indefinite nor speculative in the absence of evidence that the formula is in error. For example, as stated at § 2173.05(t):

Claims to chemical compounds and compositions containing chemical compounds often use formulas that depict the chemical structure of the compound. The structure should not be considered indefinite nor speculative in the absence of evidence that the assigned formula is in error. . . .

A claim to a chemical compound is not indefinite merely because the structure is not presented or because a partial structure is presented. For example, the claim language at issue in *In re Fischer*, 427 F.2d 833, 166 USPQ 18 (CCPA 1970) referred to a chemical compound as a "polypeptide of at least 24 amino acids having the following sequence." A rejection under 35 U.S.C. § 112, second paragraph for failure to identify the entire structure

-9-

was reversed and the court held: "While the absence of such a limitation obviously broadens the claim and raises questions of sufficiency of disclosure, it does not render the claim indefinite."

Applicants' invention, as claimed, is fully disclosed in the specification. The saturable absorber Q-switch is described, for example, at page 3, lines 5-10, and at page 6, line 2 through page 7, line 7. Methods for making the saturable absorber Q-switches of the claimed invention are set forth in the specification at page 8, line 6 through page 21, line 15. Applicants' claimed laser system is described in the specification at page 3, lines 11-21 and, with reference to Figure 1, at page 5, line 8 through page 8, line 3.

Applicants have found no reference in the application to a "silver halide color active material" in the specification. The Examiner has not explained what connection a "silver halide color active material" would have to Applicants' claimed invention, or why it would be necessary to explain how the formula of a "silver halide color active material" would be used in a saturable absorber Q-switch.

With respect to the Examiner's statement that the claims fail to recite structural limitations in order to form a saturable absorber Q-switch, the MPEP explicitly states that claims need not cite factors that are presumed to be within the level of ordinary skill in the art. For example, as stated at § 2164.08, page 2100-191:

How a teaching is set forth, by specific example or broad terminology is not important. . . . A rejection of a claim under 35 U.S.C. § 112 as broader than the enabling disclosure is a first paragraph enablement rejection and not a second paragraph definiteness rejection. Claims are not rejected as broader than the enabling disclosure under 35 U.S.C. § 112 for non-inclusion of limitations dealing with factors which must be presumed to be within the level of ordinary skill in the art; the claims need not recite such factors where one of ordinary skill in the art to whom the specification and claims are directed would consider them obvious. . . . One does not look to the claims, but to the specification to find out how to practice the claimed invention.

Citations omitted.

-10-

In contrast to the suggestion by the Examiner, the claims need not recite structural limitations necessary to form a saturable absorber Q-switch. Applicants' claimed saturable absorber Q-switches and laser system are described in the specification, including the manner and process of making and using the claimed saturable absorber Q-switches and laser systems, in such full, clear, concise and exact terms as to enable any person skilled in the art to which the claimed subject matter pertains, or with which it is most nearly connected, to make and use the same, and sets forth the best mode contemplated by the inventor of carrying out his invention. Further, the claims particularly point out and distinctly claim the subject matter of the invention. Therefore, Applicants' specification and claims meet the requirements of 35 U.S.C. § 112, first and second paragraphs.

Rejection of Claims Under 35 U.S.C. § 103(a) over Yumashev in view of Thony *et al*

Claims 1-15 and 47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Konstantin V. Yumashev, Applied Optics, Vol. 38, No.30 (hereinafter, "Yumashev"), in view of U.S. Patent No. 6,023,479, issued to Thony *et al.* (hereinafter "Thony *et al.*"). In particular, the Examiner stated that Yumashev discloses a saturable absorber Q-switch that has a monocrytalline lattice of the formula $Mg_{1-x}Co_xAl_zO_2$ where x, y and z are in the range of the claimed invention. The Examiner further stated that the lattice disclosed in Yumashev has tetrahedral and octohedral positions, and the magnesium and cobalt of the compositions occupy tetrahedral positions, and that the unit cell dimension is between about 7.97 Å and about 8.083 Å. The Examiner further stated that cobalt is present in the monocrytalline lattice in an amount between about 0.02 atomic weight percent and about 0.043 weight percent. The Examiner further stated that Yumashev does not disclose that y is greater than 2 and less than about 8, but that Thony, *et al.* disclose that aluminum (Al) has a value of y that is greater than 2 and less than about 8. The Examiner stated that at the time the invention was made, it would have been obvious to a person having ordinary skill in the art to modify Yumashev to have a value for aluminum that is greater than 2 and less than about 8, as taught by Thoney, *et al.*, because those of skill in the art would recognize that such a modification and variations can be made without departing from the spirit of the invention.

-11-

With respect to Claims 4-6, the Examiner stated that Yumashev discloses a saturable absorber Q-switch wherein z is between about 4 and 10 and y is between about 4 and 6 with different elements. Further, with respect to Claims 8 to 15, the Examiner stated that Yumashev discloses a saturable absorber Q-switch having an absorption band in a range of between about $1.34\ \mu\text{m}$ and about $1.54\ \mu\text{m}$.

As discussed in Applicants' previous Amendment, Yumashev discloses a saturable absorber Q-switch that is composed of a compound having the chemical formula MgAl_2O_4 and is doped with Co^{+2} at a concentration of 0.1 to 0.5 weight percent. As also discussed in Applicants' previously filed amendment, there is no disclosure or suggestion in Yumashev of a saturable absorber Q-switch having a spinel crystal structure that satisfies the limitation of Applicants' Claim 1 that y is greater than 2. Therefore, Claim 1, and the claims depending from Claim 1, are not anticipated by Yumashev.

Thoney, *et al.* disclose a microlaser cavity having a solid active medium emitting at least in a wavelength range between 1.5 and $1.6\ \mu\text{m}$ and having a chemical formula, as set forth, for example, at Column 2, lines 40-45. As specified by the Examiner, Thoney, *et al.* disclose a material wherein aluminum has a value of y that is greater than 2,

As with Yumashev, there is no disclosure or suggestion in Thoney, *et al.* of a saturable absorber Q-switch that includes a monocrytalline lattice spinel crystal structure having the formula $\text{Mg}_{1-x}\text{Co}_x\text{Al}_y\text{O}_z$ where x is greater than 0 and less than 1, y is greater than 2 and less than 8, and z is between about 4 and 13. Further, there is no disclosure or suggestion of such a saturable absorber Q-switch wherein most of the magnesium and cobalt occupy tetrahedral positions. The materials identified in Thoney, *et al.* that disclose a value of y greater than 2 are different than the material that is the monocrytalline lattice spinel crystal structure of Applicants' claimed saturable absorber Q-switch. For example, all of the materials identified at Column 2, lines 38-45, which was cited by the Examiner as support for the rejection under 35 U.S.C. § 103, include at least one element in addition to the cobalt that is employed in Applicants' saturable absorber Q-switch. Specifically, all of the materials that employ magnesium, cobalt, aluminum and oxygen include at least lanthanum (La) as an additional element of the composition. There is no disclosure or suggestion in Thoney, *et al.* of modifying

-12-

any material that includes lanthanum, magnesium, cobalt, aluminum and oxygen, to delete the lanthanum component.

Neither Yumashev nor Thoney, *et al.*, separately or in combination, disclose or suggest modification of their respective teachings as proposed by the Examiner. As discussed above, there is no disclosure or suggestion in Yumashev of modifying the disclosed material by including aluminum and in an amount that would cause a variable "y" to be greater than 2 in Applicants' claimed formula. There is no disclosure in Yumashev or Thoney, *et al.* of modifying the disclosed materials, wherein the variable "y" is greater than 2, by eliminating the presence of lanthanum.

As stated at § 2143 of the MPEP:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure.

Citations omitted.

The Examiner has not identified any suggestion or motivation in any of the references identified to modify or combine the teachings of the cited references. Second, the Examiner has not established that there would be any reasonable expectation of success by combining the teachings of the references to obtain Applicants' claimed invention. Rather, Examiner has merely referred to a spirit of the invention and concluded that, because the elements of Applicants' claimed invention can be found in one or the other of the combined references, one having ordinary skill in the art would have found it obvious to make the necessary modifications.

-13-

Accordingly, the Examiner necessarily has impermissibly based his selected combination of references on Applicants' disclosure.

Claims 4-6 and 8-15 all depend from independent Claim 1, either directly or indirectly. Therefore, for the same reasons discussed above, the subject matter of these claims also is not obvious in view the combination of Yumashev and Thoney, *et al.*, taken either separately or in combination.

The Examiner has not established a *prima facie* case of obviousness under 35 U.S.C. § 103 over Yumashev in view of Thoney, *et al.* Applicants respectfully request reconsideration and withdrawal of this rejection.

Rejection of Claims 16-32 Under 35 U.S.C. § 103(a)

Claims 16-32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Stultz, *et al.* in view of Yumashev and Thoney, *et al.* In particular, the Examiner stated that Yumashev and Thoney, *et al.* disclose a monocrystalline lattice having a formula within the range of Applicants' claimed invention, and that Stultz, *et al.* disclose a laser system. The Examiner concluded that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the teachings of Stultz, *et al.* to include Applicants' claimed material because those skilled in the art will recognize that such modification and variations can be made without departing from the spirit of the invention."

As with Applicants' claimed saturable absorber Q-switch, there is no disclosure or suggestion in either Yumashev or Thoney, *et al.* to make the modifications necessary to obtain Applicants' claimed monocrystalline lattice spinel crystal structure and chemical composition $Mg_{1-x}Co_xAl_yO_z$ where x is greater than 0 and less than 1, where y is greater than 2 and less than about 8, and z is between about 4 and about 13, wherein the lattice has tetrahedral and octohedral positions and wherein most of the magnesium and cobalt occupy tetrahedral positions. Therefore, there is no disclosure or suggestion to modify the laser system disclosed in Stultz, *et al.* to include the saturable absorber Q-switch included in Applicants' claimed laser system.

The Examiner has not provided any evidence of motivation, nor a disclosure or suggestion in either reference to make the necessary modifications to obtain the saturable absorber Q-switch employed in the claimed laser system. Rather, Examiner has merely referred

-14-

to a spirit of the invention and concluded that, because the elements of Applicants' claimed invention can be found in one or the other of the combined references, one having ordinary skill in the art would have found it obvious to make the necessary modifications. Accordingly, as with the rejection of Claims 1-15 and 47, discussed *supra*, the Examiner necessarily has impermissibly based his selected combination of references on Applicants' disclosure.

Applicants, accordingly, request reconsideration and withdrawal of this rejection of Claim 16 under 35 U.S.C. § 103(a). Claims 17-32 all depend, either directly or indirectly from independent Claim 16. Therefore, Applicants also request reconsideration and withdrawal of the rejection of these claims under 35 U.S.C. § 103 for the same reason as stated with respect to independent Claim 16.

SUMMARY AND CONCLUSIONS

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.

By 

N. Scott Pierce

Registration No. 34,900

Telephone: (978) 341-0036

Facsimile: (978) 341-0136

Concord, MA 01742-9133

Dated: 9/12/03

RECEIVED
CENTRAL FAX CENTER

SEP 15 2003

OFFICIAL